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SCIENCE NEWS LETTER

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15

THE WEEKLY SUMMARY OF CURRENT SCIENCE

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Engine for Space

See Page 235

A SCIENCE SERVICE PUBLICATION

Kodak reports on:

how a clever fellow can cheat himself . . . the pencil that enrages the mind . . . where a disciple can look for details . . . 70,000,000 pounds per pound

Mighty magnification

Forty bucks for a few rings and rods to put over the front of the new *Kodak Retina Reflex III Camera?**

A mite under, actually, at the camera shop. Also includes an auxiliary lens. All nicely fitted together. Called the Kodak Retina 1:1 Copying Kit. *Switch the f/2.8 lens from the camera to the kit, snap the kit onto the camera, attach the auxiliary lens and the camera's lens hood, set the diaphragm between f/11 and f/22 and the distance scale at 5 feet. Snap, swish—just like that. Make pictures. Anything in the plane of the rectangular opening is focussed on the film same size. Depth of field at f/22 is 5.5 mm. When resulting slide is projected, magnification is mighty and can be useful for mensuration if a calibrating scale has been included in the picture. Handy for picturing platyhelminthes, coins, microcircuitry, the triumphant crystals of a new enzyme you have isolated. Kit also includes a slide holder and diffusion screen for making your own black-and-white duplicates of color slides.*

If you can make this kit yourself for less than $40, you are too clever a fellow to be working that cheap.

Forced drafting

The truly creative mind tends to shy away from the petty problems of the drafting room. Then the creative mind gets angry and upset when damnable antiquated drafting procedures impede the swift and smooth transformation of its output into physical reality. Perhaps the petty problems are worth a few moments of the creative mind's time. They have solutions like

- speeding revision of drawings by picking up photographically everything from the existing drawing that is to appear in the revision
- converting drawings into rigid, dimensionally stable, non-staining, non-glaring, long-wearing overlays for contour projector screens
- making working drawings out of photographs of existing equipment instead of drawing everything
- photographic templates for standard or repeating elements in a drawing
- photographic intermediates for protecting original drawings, restoring old and worn ones, or avoiding waits for extra prints.

The Kodak Compass *is an irregular publication that will be sent free to whoever in your organization ought to be concerned with such matters. The first issue deals very plainly with pencils, inks, and eradication techniques for the new Estar Base drawing-reproduction films. Submit names to Eastman Kodak Company, Graphic Reproduction Division, Rochester 4, N. Y. Same address for quick answers to questions stirred up by these remarks.*

Small print

This little file holds some 10,000 unabridged pages of technical reports of the French Atomic Energy Commission. The lady who lives in the house across the road may find this astonishing. Your boss may be astonished. Even you may be astonished. But to the reasonably alert librarian the micro-opaque card idea is old hat. Anything we can tell you about it your librarian can tell you better.* We merely draw attention to the following accretions to the available micro-opaque literature:

- **All the unclassified scientific reports released by the U. S. Atomic Energy Commission.**
  Even reduced 20× as they are in micro-opaque form, the complete set published to date would fill 250 boxes like the one above. The indexing mechanism for this incredible mass of information is *Nuclear Science Abstracts*, a periodical sold by the Superintendent of Documents, Washington 25, D. C.
- **The 1st Decennial Index to *Chemical Abstracts*, the brilliant chemical years 1907 to 1916.**
  Contains the roots of many a chemical concept since proliferated beyond the scope of a single mind. On some 60 3″ x 5″ cards sold by the American Chemical Society (1155 16th St. N. W., Washington 6, D. C.).
- ***All* the meteorological data gathered for the International Geophysical Year.**
  Purpose of whole shebang was to gather lots of data, remember? Here they are, ready to make use of. Ask the World Meteorological Organization (IGY Meteorological Data Centre, 1, Avenue de la Paix, Geneva, Switzerland).
- ***Justus Liebigs Annalen der Chemie* from 1832 to 1958 and *Berichte der Deutschen Chemischen Gesellschaft* from 1868 to 1958.**
  The New Testament comprises four Gospels; the science of chemistry seems to be founded on only three gospels, less influential spiritually but vastly more voluminous. Microprint overcomes the voluminousness but accomplishes nothing spiritually. The third gospel, *Beilstein*, got the treatment earlier. Microcard Editions, Inc.
- **The First Six Million Prime Numbers. 1 (controversial) to 104,395,289.**
  Result of a 4-day holiday weekend with a large computer and nothing better to do than a favor for mathematicians working in number theory. Microcard Editions, Inc.

For any sustained use of micro-opaques, you need a micro-opaque reader. Ten years ago they were rare. Today the central research library that lacks one is rare. Any scientific discipline that needs to communicate large masses of data to a limited number of its disciples should consider microprint. For suggestions on how to proceed, write Recordak Corporation, 415 Madison Avenue, New York 17, New York (Subsidiary of Eastman Kodak Company).

How to stick together

The naive dream of a stickum to stick metal to metal without heat, waiting, clamping, or shrinkage came true in November, 1958, with the announcement of *Eastman 910* adhesive. Because it is the costliest adhesive on the market, pound for pound, we dubbed it "the adhesive to use when no other will do." This is candor gone wild. It neglects the fact that a pound yields about 14,000 drops, each of which can bond one square inch of almost anything—not just metal—to a square inch of almost anything else so that as much as 5000 pounds can be required to pull them apart. (Porous materials drink up more adhesive.)

Thousands have bought samples by mail order. Hundreds of the sample-buyers have solved serious assembly problems with the stuff. Techniques have evolved. They have to be seen to be believed. To show some of them, we have made a 15-minute sound movie for showing to professional and industrial groups. It demonstrates how-not-to's along with the how-to's.

To borrow the film for a showing, write Eastman Chemical Products, Inc., 260 Madison Avenue, New York 16, N. Y. (Subsidiary of Eastman Kodak Company).

Price is subject to change without notice.

*Most versatile 35mm camera we make. Also works with *Kodak Retina Reflex S* and *IIIS Cameras*. Kit designed for f/2.8 models only.

*The reason *we* try to tell you is that we want to sell the raw photographic materials on which microprint cards are printed. We also want to sell microfilm. The librarian can tell you about *that*, too. A new conventional-sized reference, "Guide to Microforms in Print" ($4, Microcard Editions, Inc.), summarizes everything available.

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science

Kodak
TRADEMARK

SPACE

Ion Engines: Key to Space

Astronauts could fly to Mars between 1975 and 1980 in electrically propelled spacecraft powered by ion engines. Trips as far as the planet Pluto may be possible.

See Front Cover

➤ BY 1975 or 1980, United States astronauts may be ready to make a round trip to Mars in an electrically propelled spacecraft powered by a cluster of ion engines.

The ion propulsion system was described as the possible key to very long-range travel in deep space—not only to near planets such as Mars and Venus, but for the much longer trips to Neptune or even Pluto, more than 3.5 billion miles away.

Ion engines do not provide enough thrust to boost a space vehicle out of the earth's gravitational field. But after a chemical rocket engine provides the initial boost, low-thrust ion engines can take over to provide the continuing, steadily increasing velocity needed for long hauls.

Payloads may be as big as 50% of the spacecraft's initial mass. Ion engines may require 20 or 30 times less fuel than conventional chemical rockets.

An experimental engine was demonstrated at Hughes Aircraft Company's research laboratories, Malibu, Calif. Hughes began work on the engine September 1, 1960, under contract from the National Aeronautics and Space Administration.

The engine is seen being readied for testing in simulated space on this week's cover.

Scientists from NASA and Hughes are predicting space tests of a more advanced engine by late next year, and a test of a complete ion propulsion system by 1965. Unmanned, instrumented probes driven by ion engines would follow, possibly leading to manned flight by 1975 or 1980.

In space, the engine's main power source will be a reactor that converts nuclear energy to electricity. Cesium is the chemical used as fuel. The atoms of cesium are converted to ions when cesium vapor is diffused through a hot tungsten element. The ions are accelerated to a high exhaust velocity by applying voltage to a system of electrodes. Electrons are then injected into the high-velocity ion beam to provide space-charge neutralization.

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ASTRONOMY

Ancient Meteor Split To Hit Earth Twice

➤ AN ANCIENT meteor bombarded earth and made two hits, one in the United States and one in Australia, after circling the earth as a natural satellite.

Dr. H. J. Axon of the University of Manchester, England, suggests this explanation to account for the fact that two meteorites, although found half a world apart, are remarkably similar in their structure. He believes the meteor from which the meteorites came could have been heated up and then cooled down as it journeyed around earth in a non-circular orbit.

The meteorites, a 500-pound one from Bear Creek in the United States and a 71-pound one from Narraburra in Australia, are not only chemically identical but have the same microstructure, Dr. Axon reports in Nature, 191:1287, 1961.

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SPACE

Space Engine to Run Indefinitely on Battery

➤ A COMPACT, electrical space engine, capable of operating indefinitely by battery and solar cell power, has been developed.

The lightweight engine, which obtains its thrust from the magnetic "pinching" of an inert gas such as nitrogen, was described by scientist Alfred E. Kunen, of Republic Aviation Corporation, Farmingdale, N. Y. He said the company expects to have a "flyable" model ready for space flight early next year.

The new engine meets practical requirements, both size and weight, for actual space ship and satellite use. It can be operated continuously in near and deep space for years without the need of service of any kind, Mr. Kunen said. Engines of this kind will be needed to propel and "steer" space ships from planet to planet with pinpoint accuracy, and for other missions that include control for reconnaissance, and communication satellites for military and commercial purposes.

Mr. Kunen said it is the ideal acceleration system for: 1. maintaining spin rates in satellites that are spin stabilized, 2. changing a satellite orbital path when such changes are necessary, 3. maintaining a satellite in a low-altitude position offsetting the effects of outer atmosphere drag, 4. maintaining a satellite in a 24-hour orbit to perform such delicate functions as rendezvous or docking of smaller satellites with larger space stations, and 5. preserving the relative position of a host of satellites performing a single mission.

The pinch plasma engine, Mr. Kunen explained, uses readily available inert gases for fuel. The fuel becomes ionized after injection into the engine and the resultant plasma is electromagnetically accelerated and exhausted out the nozzle at extremely high velocities. The high velocity of the exited plasma results in economical use of fuel. Exhaust gas velocities of over 100,000 miles per hour and ejected gas temperatures in the order of 200,000 degrees Fahrenheit have been measured.

Yet relatively cool wall metal temperatures of 200 to 300 degrees Fahrenheit are maintained, eliminating need for auxiliary cooling effects. Practically no erosion of primary engine components ever has been encountered. There are no moving parts in the engine.

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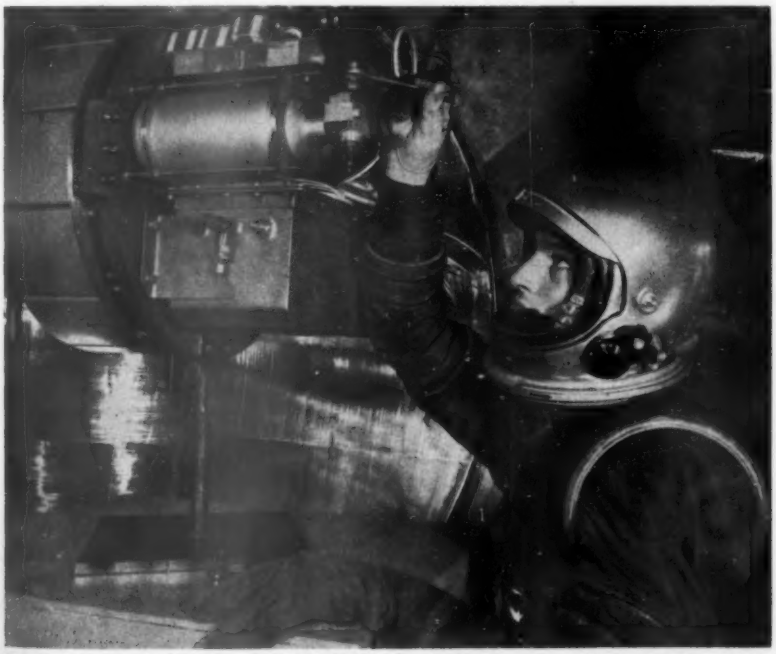

SET FOR SPACE—"Space technician" makes pressure adjustments on self-contained space engine whose batteries are recharged by means of solar cells.

PUBLIC HEALTH

Plans Stress Home Care

➤ AMERICANS learn from the British when it comes to more effective home care for the sick.

The chief medical officers of both nations' health services in addressing the American Hospital Association in Atlantic City, N. J., found common ground in how to care for the ill outside of hospitals.

The British National Health Service, frequent target of American doctors as socialized medicine, is not "necessarily suitable to another country," Dr. George E. Godber, chief medical officer of the Ministry of Health, said.

But Dr. Luther L. Terry, Surgeon General of the U. S. Public Health Service, said he was particularly interested in the British idea of comprehensive home care.

Dr. Godber said the British plan for organizing medical care is that the hospital should become a medical and reference center where all doctors in the area meet. Medical care depends foremost on the family doctor, and 49 out of 50 patients have enrolled with one physician. But the specialist works mainly in hospitals.

British physicians are expanding their group practice, he explained. This means that four or five doctors, working with health visitors, home nurses and midwives, can serve 10,000 people.

"Medical care cannot stand alone," Dr. Godber said. "It is part of a wide pattern of social service in which the doctor must work with many others with different training and experience from his own."

Most of the British chronically ill are old and frail, he said, but through intensive hospital treatment during short periods of acute illness, they can be returned to their homes for geriatric care.

Dr. Godber feels hospitals should be used only for the things they must do to support the greater value of home care.

He predicted a decline by 1975 of mentally ill patients who need to occupy hospital beds in Britain. Through increased use of tranquilizers and psychiatric care, home care can be substituted and patients returned to society to live, instead of merely existing.

Dr. Terry said arrangements had been made with Dr. Godber for a number of Public Health Service observers to visit the United Kingdom this fall to study British methods of caring for long-term patients.

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INVENTION

Patents of the Week

➤ A SUBSCRIPTION television system described as "unique and inexpensive" has been patented. Paramount Pictures Corporation, New York, was assigned rights to patent No. 3,001,011, awarded to Phil H. Weiss, Panorama City, Calif., and Abraham M. Reiter, Reseda, Calif.

Features stressed by the inventors are the "excellent security" given broadcasters by the equipment used in scrambled program transmission, plus the alleged low cost of the unscrambling coin box attachment for home receivers.

A Federal Communications Commission spokesman said that no applications involving use of the Paramount pay-TV system have been received. Although interest in pay-TV is high, the only application currently on file is from Hartford, Conn., where a test of Zenith's "Phonevision" system is contemplated. Closed-circuit systems such as Telemeter, due for trial in Little Rock, Ark., are not under FCC jurisdiction.

With the Paramount system, non-subscribers or unpaid subscribers see only a "gray-level" signal, transmitted instead of the usual horizontal blanking and synchronizing pulses. The coin box is mounted between the antenna and the set's antenna terminals. When it is activated, a pulse generator reshapes incoming signals into a clear picture.

To foil those who just want to listen without paying, sound is transmitted on two different channels and switched back and forth at irregular intervals. The program sound heard by paid viewers is replaced from time to time, on unpaid sets, by "very annoying" sounds from what is called the "nonsense audio," the inventors explained.

A third sound system, called "barker audio," can be used at intervals to tell subscribers what is playing and how much it costs. The "barker" hushes when the fee is paid.

A subscriber can deposit cash, or merely push a button on the box, causing a recording to be made that signifies his intention of "buying" the program and being billed for it later. He can then be told by the "barker" how to set two manually operated controls on the box so that selector switches are in their correct positions.

A method of preparing a vaccine to immunize dogs against infectious canine hepatitis won patent No. 3,000,788 for Jerrell B. Emery, Zionsville, Ind. Rights were assigned to the Dow Chemical Company, Midland, Mich.

The process involves growing canine hepatitis virus in cultures of pig kidney, then harvesting the virus-containing fluids after five to seven days. The discovery that pig kidney cultures can be used in vaccine production is important commercially, the inventor said, because pig kidneys are cheaper and more readily obtainable than the canine kidneys previously used.

An "audible fishing lure," designed to attract fish by duplicating the intermittent sounds produced by small animals such as frogs, won patent No. 3,000,130 for Henry Pankuch, Los Angeles, Calif. When the torpedo-shaped plastic lure is drawn through the water, a metal propeller turns, causing two small extensions to engage a row of metal teeth and produce an audible tone.

Patent No. 3,000,262 was issued to Jacob Rabinow, Takoma Park, Md., and Arthur O. Morse, Kensington, Md., for a photoelectrically controlled rearview mirror for automobiles.

Operating automatically with no attention from the driver required, the device uses photocells to control the mirror's reflective power and cut down the glare from the headlights of a car behind if the light intensity is too bright.

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GENERAL SCIENCE

Science Versus Magic

▶ NON-TECHNICALLY trained people, who in many cases have administrative power over science, often confuse science with magic.

This is what a scientist, Dr. George E. Valley, professor of physics, Massachusetts Institute of Technology, Cambridge, Mass., told the Air Force Association convention in Philadelphia.

He said this confusion is caused by thought habits and ideas people pick up without thoroughly studying the subject.

Such "non-educated" persons act as if the fruits of science, namely technology, are gathered by means of magic. This is the kind of magic from the fairy tale and ghost story in which "you get a big effect for a small effort."

When the real understanding of science and technology is lacking, certain superficial similarities between magic and use of scientific achievements are evident. In the modern world today it is unpopular to believe in magic, but it is considered commendable to believe in science. Therefore the scientific "miracles" take the place of magic in untrained minds.

For example, a magician can utter magic words and get knowledge of a distant place. In symbolic effect this may not differ too much from the long distance telephone.

But it does differ. The use of the telephone is not secret as are the wizard's formulas. The benefit of the telephone goes to many people instead of only the magician.

Dr. Valley summed up the characteristics of science and technology as they differ from those of magic:

1. "No fact of science or product of technology, however it may be classified, can be known to but a single man. 2. The benefits of science and technology can accrue to any one of us only through the cooperation of many people. 3. The benefits of technology can accrue to a particular person not simply because he is that person but because he is enabled to place himself physically in position to receive those benefits. 4. The devices of technology are fallible, sometimes they need repair. 5. The knowledge and the predictions of science are never perfect, perfection being regarded as an approachable but unattainable limit. 6. Technological devices unlike magical ones do neither protect their users from harm nor do they necessarily cause harm to people. 7. From science and technology you do not always get what you want; all you can have is what men know how to make possible from their always imperfect understanding of nature."

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NATURAL RESOURCES

Cheaper Water From Sea

▶ LOWER COST conversion of undrinkable sea or brackish water to potable fresh water will come closer to practicality through use of $75,000,000 appropriated by Congress for the next six years.

Lowest cost achieved so far is one dollar per thousand gallons compared with the cost from ordinary sources of 30¢ per thousand.

The money is for research and development in the Government's saline water conversion program. Eventual goal of the program is to supply the nation with cheap drinking water from the oceans and brackish water.

The bill provides a strong stimulus to the present program, which spent only $1,300,000 during the last fiscal year.

The water supply problem is becoming quite serious in the United States because of increasing water needs and pollution of available water resources. Water demands have jumped from 40 billion gallons daily in 1900 to 312 billion gallons today. The figure is expected to top 435 billion gallons 15 years from now.

Nine years of Government research have whittled the cost of salt water conversion from four dollars for 1,000 gallons of fresh water down to one dollar a thousand. The latter figure was reached at an experimental plant constructed last year in Freeport, Texas.

Plants utilizing various processes are also being built in San Diego, Calif., Roswell, N. M., Webster, S. Dak. and Wrightsville Beach, N. C.

Methods currently being tested include the freezing, ion-exchange and the time-honored distillation process.

The freezing process, the most promising method thus far, cools the sea water to a slush of ice crystals and brine. The ice crystals are then separated and washed off.

The ion-exchange process uses an electric field and thin plastic membranes to separate the dissolved salt in the water. It is best for brackish waters and is now being tested on the slightly salty waters trapped in the rocks beneath the Webster plant just completed.

The 1,000,000-gallon Freeport plant is trying a slight variation of the oldest known process for converting salt to fresh water—distillation. Government scientists are trying to cut down the high cost due to the expensive fuel and scaling normally associated with distillation. Arid oil-rich Kuwait already has a distillation plant reclaiming nearly 5,000,000 gallons of fresh water a day from the sea. The cost is high, but the people have no choice.

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POWERFUL MAGNET—A magnet wound from a superconductor is the first to achieve the outstanding magnetic strength predicted by theory. It is considered the forerunner of future super-strength magnets that may make possible the direct generation of electric power, more powerful atomic reactors and the harnessing of nuclear fusion.

TECHNOLOGY

Superconducting Magnet Generates High Field

▶ A SUPERCONDUCTING magnet that is expected to help harness the enormous energy of the hydrogen bomb for peaceful purposes has been developed in Pittsburgh by Westinghouse scientists.

For its size, weight and energy consumption, the superconducting magnet is believed the most powerful ever built. It produces a magnetic field of 43,000 gauss, about a third the most powerful produced in the United States, yet is only the size of a doughnut and weighs only one pound.

The new magnet is wound from a wire that is a superconductor, a material that loses all apparent electrical resistance at temperatures near absolute zero, or 459.7 degrees below zero Fahrenheit. Once started, electrical currents flow through superconductors without loss in strength.

Dr. J. K. Hulm, associate director of the Westinghouse research laboratories, said development of the superconducting magnet would make possible a "whole new generation of powerful atom smashers." It also makes possible some of the "far-out methods" proposed for long-distance space travel.

The new, low-temperature electromagnet is made of an alloy of niobium and zirconium. It contains about a half-mile of wire about the diameter of sewing thread, which is immersed in liquid helium to cool it to temperatures near 450 degrees below zero Fahrenheit.

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MEDICINE

Care for Aged Problem

➤ THE MOST IMPORTANT problem facing hospitals in this period of rising costs is providing adequate care for the aged, the new president of the American Hospital Association, Dr. Jack Masur, told SCIENCE SERVICE. Dr. Masur, who took office Sept. 27 at the American Hospital Association meeting, Atlantic City, N. J., is the first Federal Government official to head this national organization. He is director of the world's largest research hospital, the Clinical Center of the National Institutes of Health, Bethesda, Md., and also an assistant surgeon general of the U. S. Public Health Service.

Dr. Masur was interviewed on the important problem of medical care, with special relation to Federal measures in effect and proposed, especially for the 17,000,000 over 65.

Q. Does the Kerr-Mills Act which depends on the state-Federal matching of funds offer adequate care for older people?

A. Admittedly, the Act alone is not sufficient to meet the needs of the aging. However, in combination with the Blue Cross voluntary health insurance and commercial carriers it is thought by the majority of American Hospital Association members to have potential adequacy.

Q. Do you mean that the Act as it stands could be improved?

A. Its accomplishments to date are being carefully studied by the American Hospital Association staff. The content of each of the state provisions among the present 40 cooperating states is being analyzed to determine how a more adequate bill might be set up.

Q. One of the common problems today is long-term hospitalization for chronic diseases such as cancer. How can the average person anticipate such expense?

A. All income groups are potentially indigent if they lack sufficient hospital insurance. The Blue Cross cannot meet the total cost, of course, because of the need for some type of voluntary health insurance to cover more comprehensively the cost of physicians' services, drugs, appliances, etc.

Q. As a Government employee, are you expected to advocate the Kennedy Administration medical care program when American Hospital Association opposes it?

A. No, but I accept the responsibility of assuring sufficient hospital care to all ages. This cannot be guaranteed overnight, and it does not mean that the hospitals should be expected to give custodial care that is nonmedical.

Q. What about nursing homes?

A. We have almost half a million people in nursing home beds. There is an urgent need for improvement of standards of care in a great many nursing homes. We particularly need a national inspection and approval program similar to that conducted by the Joint Commission on Accreditation of Hospitals.

Q. Is there still a shortage of nurses in nursing homes and hospitals?

A. Yes. The American Hospital Association is working with the National League for Nursing and the American Nurses Association to try to bring more properly trained men as well as women into the profession.

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MEDICINE

Latest Medical News

➤ PARENTS who expect antibiotics to be given their children for every case of sore throat should leave the decision to the pediatrician without undue fear of rheumatic fever.

Of 2,545 Chicago school children admitted to a pediatric outpatient clinic, only two, untreated with penicillin, developed rheumatic fever, Drs. Alan C. Siegel, Eloise E. Johnson and Gene H. Stollerman, all of Northwestern University Medical School, report in the New England Journal of Medicine, 265: 559, 1961.

The physicians state that although some type of streptococcal infection is carried in the throats of even healthy school children, its relative mildness offers small risk of the childhood disease that so often damages the heart. Dr. Stollerman also reports the findings in the Journal of the American Medical Association, 177:823, 1961. The Chicago doctors advise further studies of civilian streptococcal pharyngitis (sore throat) outbreaks to help guide pediatricians in treatment.

Automobile accidents are sometimes due to the quiet, luxury and comfort of modern cars, Prof. E. Lowell Kelly, chairman of the University of Michigan's department of psychology, reports. Car interiors now put us in a comfortable position, in a favorable climate, with soft, even noise. This makes people fall asleep, which accounts for many of the single car accidents in Michigan that cause 30% of the state's traffic fatalities.

One in four elderly persons in nursing homes, even in their 80's, can be taught to care for themselves sufficiently to warrant sending them home, John Bigelow, executive director of the Washington State Hospital Association, believes.

Cocktails should be avoided in airplanes if a passenger is subject to motion sickness, Dr. Charles D. Aring of the Cincinnati General Hospital (Ohio) says in partial answer to a question in the Journal of the American Medical Association, 177:885, 1961. Dramamine is the preferred medication, he states. Dr. Aring, however, says that some psychiatrists subscribed to the use of a cocktail or two prior to flight provided the person is in good physical health and subject to emotional reaction caused by giddiness and apprehension until level flight is attained.

Eye color of children is unpredictable, Dr. F. Clarke Fraser of McGill University, Montreal, Quebec, Canada, tells a questioner in the Journal of the American Medical Association 177:884, 1961.

Although two blue-eyed parents usually have blue-eyed children, this is not always true. It is an over-simplification when textbooks state that blue eyes turn brown. However, a number of children with hazel or brown eyes were born with blue eyes that darkened in the first months of their lives.

Increased cost of medicine is predicted by the Pharmaceutical Manufacturers' Association as a result of the decision of the U. S. Food and Drug Administration requiring prescription drug manufacturers to place inserts in most of their packages describing side effects of the drugs. By next March 5, the ruling must go into effect. The druggists say it will add millions to the cost of the drugs and will not promote the desired safety that FDA expects.

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ANTHROPOLOGY

African Diet Studied

▶ THE HERREROS of Africa should be prime candidates for heart attacks if diet alone means anything, for they eat practically nothing but meat, fat and milk products.

On such fare, according to much Western medical research, the veins of the Hereros should be lined with cholesterol leading to heart disease and death at an early age for a large percentage of the population.

Nevertheless, the Hereros do not appear to have an abnormally large number of deaths from heart disease, Dr. Gordon D. Gibson, anthropologist of the Smithsonian Institution, Washington, D. C., found on a nine months' stay in South West Africa and Bechuanaland where the Hereros live.

Dr. Gibson told SCIENCE SERVICE hospital records in the area do not show that many Hereros died of heart disease. The most common serious diseases in the area are pneumonia, tuberculosis, malaria and venereal diseases.

Dr. Gibson, his wife and assistant Bethune M. Gibson, also an anthropologist, and their two children spent nine months in Herero country studying the tribe's diet and social system. They brought back with them many samples of Herero life, clothing, ornaments and utensils that will be exhibited in a new hall on Africa at the Smithsonian.

Dr. Gibson also collected samples of and information about the various foods eaten by the Hereros in an attempt to find out why and how the Hereros escape the scourge of heart disease known in the West.

He and Mrs. Gibson found that some of civilization's products had reached even the remotest areas. They found that men, women and children smoke in even the most remote Herero tribe they visited. Coffee, tea, and especially sugar, were desired by these Africans who did not show as much interest in salt—an old stand-by carried by missionaries in the past, together with colored beads.

The Gibsons visited three Herero areas of different degrees of westernization. In one, the police zone of South West Africa (under South African rule), the people had had considerable contact with whites. Many of the huts are built on the Western square plan in contrast to the local-style round huts. In addition, enameled, store-bought cooking vessels are used instead of the old wooden ones.

Another group in Bechuanaland has had a contact with whites in the past and is in an earlier stage of acculturation. However, they do wear the European clothing introduced by the whites around 1850 as do the more civilized groups.

A third group visited by Dr. Gibson lives in the northwest corner of South West Africa just south of the Angola border. This group was the least westernized, wearing leather clothing and heavy ornaments of iron beads made from European scrap iron worked by wandering smiths from other areas.

Dr. Gibson found that all three groups of Hereros rely for their main source of food on their cattle, sheep and goats. One Herero told Dr. Gibson that meat is food, but corn is just something to fill the stomach. The Hereros sometimes do have to eat corn and pumpkins, which they grow, and wild-growing greens, roots and berries when their milk and meat supply does not hold out. Sometimes the herds are reduced when grazing is bad because of poor rainfall. Cattle diseases also diminish the herds.

When food is needed "to fill the stomach" Hereros cook a green, *Amaranthus thunbergi*, called omboa by the natives. A berry, various species of the genus *Grewia*, that tastes like the currant but has larger seeds is also collected.

However, the Hereros prefer meat and thickened milk that is shaken in large calabases with leaves and roots for 15 to 20 minutes until it thickens. They also like a clear butter that is boiled until all the water disappears. This butter is eaten "straight" by the spoonsful but is also used on greens. The butter is stored for long periods in large cowhide vessels with a seal of mud and cow dung that keeps it from getting rancid too quickly.

Several months of detailed study will be necessary before any conclusions can be reached about the relationship between the Herero diet and incidence of heart disease. Dr. Gibson said the reason Hereros do not have as much heart disease could possibly be due to a racial factor, to exercise, or to the early mortality due to other diseases.

The study was carried out by the Smithsonian Institution with supporting grants from the National Science Foundation and the National Institutes of Health.

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AFRICAN HERREROS—A Herero woman, left, is seen wearing the European style clothing brought to Africa around 1850. The headdress is an adaptation from the European style. Above, two Herero women from South West Africa are mending a woman's cape later brought back to the U. S. for exhibit at the Smithsonian Institution.

VITAL STATISTICS

Pay Earners Live Longer Now Than 75 Years Ago

▶ THE AVERAGE American wage earner can expect to live twice as long as his forefathers did about 75 years ago and a little longer than the average person in the United States today.

Statisticians of the Metropolitan Life Insurance Company, New York, report that the average life span of its millions of industrial policyholders reached a new high of 70.5 years in 1960, more than twice the longevity during 1879-94, the earliest period for which data are available. The largest gains are in the younger ages where mortality has been traditionally high, increasing 5.9 years for the five-year-old during the last two decades.

The gain for those 65 years of age for the same period was 2.3 years. The life expectancy of the group as a whole, which was six years less than that of the average population about 50 years ago, is now slightly greater.

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PUBLIC HEALTH

AMA Polio Vaccine Stand Challenged by Scientist

➤ SALK VACCINE has reduced polio to a minor health problem that does not justify mass vaccination programs proposed by the American Medical Association as a result of licensing the Sabin live poliovirus vaccine, a Johns Hopkins University professor believes.

Dr. David Bodian, director, department of anatomy, states in Science, the journal of the American Association for the Advancement of Science, 134:819, 1961, that there is a place for both types of vaccine, however, and that in a democratic society, a choice should be offered.

He is challenging the "inevitable" changeover predicted by the AMA that would relegate the Salk vaccine to the discard.

Widespread use of the Sabin vaccine in the United States is still some distance away in spite of the recent licensing of Pfizer, Ltd., Sandwich, England, by the U. S. Public Health Service to manufacture Type I of the live oral vaccine. American distribution will be by Chas. Pfizer Co., Inc.

Surgeon General Luther L. Terry of the PHS has emphasized that until Types II and III of the oral vaccine are licensed, the Salk vaccine remains the recommended choice.

In spite of this, Dr. Bodian points out, the AMA Council on Drugs has proposed a mass vaccination program, involving those who have previously been vaccinated as well as unvaccinated individuals.

This premature proposal "contains the seed of futility and embarrassment," Dr. Bodian states, adding that "such a procedure would eliminate the possibility of a definite evaluation of either vaccine in this country," and is unlikely to accomplish more than a conservative approach would do.

Even after licensing, he says, a new vaccine product must be considered to be on trial. Whether polio is now a significant health problem in the U. S. is debatable, he believes.

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GENERAL SCIENCE

Failure to Communicate Seen as Science Crisis

➤ SWAMPED with a steadily increasing flood of scientific and technical information, America's scientists and engineers are failing to communicate clearly and adequately with themselves and the public.

The result is a serious slow-down in important research and development work, a conference in Philadelphia on "The Crisis in Technical-Scientific Communications" was told.

Inadequate communications were blamed for causing millions of dollars worth of information to be lost or withheld from workers who need it. Thousands of valuable professional man-hours are lost because of "obscure, wordy, pompous, fragmentary, disorganized, incorrect, misleading linguistics."

A scientist or engineer must write in a style that can be readily understood and absorbed by his chosen audience, said Irwin Hersey, publications director for the American Rocket Society, New York.

The writer, Mr. Hersey said, must be clear in his own mind as to which of his three main audiences he is addressing — workers in his own field, workers at the same professional level but in different fields, and the general public.

Dr. Eugene Garfield, director of the Institute for Scientific Information in Philadelphia, compared scientific information to "any other product which must be manufactured, packaged and sold. . . . It is a useful product if it receives proven consumer acceptance. If its acceptance declines, the consumer is ready for a change."

Dr. Thorrel B. Fest, University of Colorado Communications consultant, said scientists "unintentionally may be contributing to the development of unrealistic and even dangerous attitudes" because they do not know how to tell the public what they are doing.

Beverly Dudley of the Laboratory for Electronics, Boston, Mass., said a research worker and a skilled science writer can form "a highly effective team to interpret the significance of research in a stimulating manner."

Pointing out that motion pictures and technical photography are powerful tools for rapid interchanges of information, Charles O. Probst of Cook Technological Center, Chicago, paraphrased Confucius to comment that "a ten-minute motion picture can be worth ten thousand words, and communicate ten times as much."

The conference was sponsored by the Institute of Radio Engineers through its professional group on engineering writing and speech.

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PSYCHOLOGY

Bitter Taste Sensitivity Linked to Food Dislikes

➤ THE HIGHER a person's sensitivity to the taste of bitter substances, the more foods he is apt to dislike, tests conducted by four Ohio researchers show.

Forty-eight persons were asked to name their dislikes and aversions from a list of 118 foods. The highest percentages of rejected foods were reported by those who were later shown to have a low taste threshold, indicated by extreme sensitivity to bitter compounds such as quinine.

The tests were made at Ohio State University Health Center, Columbus, and Fels Research Institute, Yellow Springs, Ohio. The work is reported by Dr. Stanley M. Garn, R. Fischer, F. Griffin and S. England in Nature, Sept. 23, 1961.

They raise the possibility of curing food aversions by using compounds from which thyroxine is formed. Some of these compounds are known to be effective in changing taste thresholds. Thyroxine is the fundamental active substance in the thyroid gland.

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IN SCIEN

SURGERY

Split-Skin Grafting Helps Wounded Finger-Tips

➤ GRAFTING of split skin from other parts of the body is the recommended method of repairing workmen's finger-tip injuries in Guy's Hospital, London, it is reported in the British Medical Journal, Sept. 23, 1961.

Workmen who snip off pulp and bone from the ends of their fingers make up a majority of those who come to the emergency room for surgical treatment, Dr. F. J. Moynihan, senior registrar of the hospital's orthopedic department, reported. Non-specialists can best perform the split-skin type of grafting.

The operation is performed under local anesthesia, administered to the part of the body from which skin is taken for grafting as well as to the finger area. The graft is sewed in place and a non-adherent dressing is applied.

In 100 cases of split-skin grafting, 80% were successful.

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PHYSICS

Theory on Radioactive Fallout Is Developed

➤ A NEW THEORY for predicting the amount of radioactive fallout from nuclear blasts has been developed by a United States scientist. The accurate method is limited to surface explosions.

With the United States steering away from surface blasts, a computer "model" of the method is now being used to predict fallout dosages from large and small nuclear weapons. The data will be helpful in planning shelter programs and determining how long contaminated areas remain "hot" with radioactivity.

Dr. Albert D. Anderson of the U. S. Naval Radiological Defense Laboratory in San Diego, Calif., based his method on the following assumptions:

1. Fallout begins soon after detonation and before the mushroom cloud reaches its maximum altitude.

2. The radioactive particles are uniformly scattered throughout the cloud.

3. The speed of a radioactive particle depends on the difference between the cloud's rising speed and the pull of gravity.

4. The time of a rising or falling particle to travel through a given layer is inversely proportional to the rate of rise or fall of the particle.

Fallout properties computed from the resulting formula compared very favorably with observed data from nuclear explosions conducted a few years ago, the scientist reports in the Journal of Meteorology, 18:431, 1961.

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NE FIELDS

MEDICINE

Oxygen Amount Affects Cancer X-Ray Treatment

➤ BY PLACING cancer patients in an atmosphere of increased oxygen pressure, victims of malignant tumors should have a much better chance of avoiding X-ray damage to normal tissues while their cancer growth is being reduced.

This is because the amount of oxygen surrounding a cancer increases the amount of damage by X-rays, Drs. James Nickson of New York's Memorial Hospital for Cancer and Allied Diseases and Titus C. Evans of the State University of Iowa reported.

They told a forum sponsored by the American College of Radiology in New York that radiation biologists have found many factors determine the "extent of damage a living cell will undergo from a given dose of radiation."

The first "clinical fruit" of this research was the discovery that the amount of oxygen surrounding a cell very significantly affects that cell's radiosensitivity.

The basis of the use of oxygen in X-ray treatment of cancer is the two-fold supposition that cells in tumors are protected from irradiation damage by the low oxygen concentration around them, and that this protection can be abolished by increasing the partial pressure of the respired oxygen.

First applied to animals, this hypothesis has now been shown applicable to humans.

"The radiation therapist," the scientists said, "can now be given tools which have immediate great promise for sharp improvement in the assistance of patients with cancer, by ionizing radiation."

The forum was held at the New York Academy of Sciences.

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VITAL STATISTICS

Health Insurance Cuts Poland's Infant Deaths

➤ POLAND credits a system of universal insurance against sickness as one of the chief factors in a "remarkable" decline in infant and child death rates since World War II, delegates to the International Population Conference in New York were told.

Since 1950, infant death rates from all causes except congenital malformations have decreased substantially, Z. Padowicz, head of the central statistical office at Warsaw, said.

He pointed out that health insurance coverage for workers and their families is supplemented by free medical care for all infants less than one year old, insured or not.

In addition, dispensaries have been established for mothers and children, and hospitals and delivery rooms have been brought to rural areas. For insured persons, the price of medications has been reduced to 30% of the usual sale price.

In the last 60 years, Mr. Padowicz said, Poland has cut its infant mortality rate by two-thirds and its child mortality rate by almost 95%. The life expectancy rate, which was 31.9 years 120 years ago, had increased by 1956 to 61.8 for men and 67.8 for women. In 1931-32, it was 48.2 for men and 51.4 for women.

Deaths among Poland's urban population from tuberculosis and other respiratory diseases have been reduced by 75% during the past 35 years, he said.

The conference, organized by the International Union for the Scientific Study of Population, was held at New York University.

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BIOCHEMISTRY

Miners' Flotation Used on Bacteria

➤ AN IMPORTANT technique of the mineral and chemical engineer, flotation, may also prove helpful to the biologist and food-processing engineer.

Prof. Antoine M. Gaudin, Richards professor of mineral engineering at the Massachusetts Institute of Technology, pointed this out at the celebration in Denver, Colo., of the 50th anniversary of froth flotation in the United States. Speaking at a meeting arranged by the American Society of Mining Engineers, he reported the findings in work done under contract with the U.S. Army Chemical Corps at MIT. It indicated that microorganisms could be separated by differential flotation.

In experiments with cultures of *Escherichia coli*—a readily available, hydrophilic, non-toxic organism, which would not float—it was found that by adding salt to the concentration the number of organisms in the tailing from flotation could be reduced to the vanishing point. And in experiments with another microorganism, the researchers found that its spores could be separated from vegetative cells of the same organism by flotation. They succeeded, too, in floating a contaminant from a mixture of organisms of this type.

Hence, Prof. Gaudin suggested, flotation may be helpful in such projects as the treatment of soils for the isolation of various strains of antibiotic-producing organisms.

Ore pulps are commonly described in terms of the percentage of the pulp that is fine enough to pass through a 200-mesh sieve. The microorganisms with which Prof. Gaudin has been dealing could pass through a 20,000-mesh sieve, and are so light that their settling velocity in a liquid is vanishingly slow. They are, moreover, living, reproducing and dying things, rather than inanimate particles, which makes the striking of a balance of materials very difficult. Nevertheless, the experiments showed, they can be floated from one another, or concentrated in a portion of the aqueous phase, and the operation can be both simple and rapid.

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ASTRONOMY

Super-Giant Galaxies Send Out Radio Signals

➤ THE SUPER-GIANT galaxies, huge star systems containing millions upon millions of stars, are believed to send radio waves forth into space for only a very limited part of their lifetime.

Although all large clusters of star systems contain super-giant galaxies, only very few of them are radio-galaxies, the Russian astronomer, Dr. V. A. Ambartsumian, incoming president of the International Astronomical Union, reported to the Union in Berkeley, Calif. He said the radio-emitting activity of such galaxies must be a short phase in the evolution of such systems.

The material causing the radio emission from the systems is apparently part of the outflow from the center, or nucleus, of energy masses even more powerful than the super-giant galaxies at a certain stage in their life cycle, Dr. Ambartsumian said.

He added that observations of huge bursts of energy from one giant galaxy do not conform to the information astronomers now have about the shapes of the nuclei of galaxies. What goes on in other radio galaxies is even more difficult to interpret.

"The few facts at our disposal show that these data may come in conflict with the law of conservation of energy (and matter) as it is in its present form and perhaps require a generalization of this law," he said.

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PHYSIOLOGY

Recover Sense of Smell After Vitamin A Shots

➤ A LOST SENSE of smell was recovered by 48 of 53 patients given large intramuscular injections of vitamin A.

Drs. M. H. Briggs and R. B. Duncan of Victoria University of Wellington, Wellington, New Zealand, report in Nature, 191: 1310, 1961, that animals raised on diets free of carotenoid (group of yellow, orange, red and purple pigments) will have an impaired sense of smell.

Experiments on the olfactory areas of the heads of freshly killed cows indicated that these tissues contain free carotenoids and free vitamin A.

It has been known for years that the soft membranes of the olfactory areas are yellow whereas areas not related to the sense of smell are not. These yellow areas are known to contain carotenoids, which in experiments can be liberated by acetone from combination with proteins.

The scientists believe it is reasonable to assume that protein-bound carotenoids of the olfactory membrane receive energy from the olfactant molecules entering the nasal cavity.

The fact that patients treated with vitamin A recovered their sense of smell is probably related to interaction of carotenes (capable of conversion into vitamin A) and simple carotenoids in the olfactory area.

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EDUCATION

Speedy Reading for Jet Age

Reading speed of most adults is totally inadequate. Special courses can increase most persons' reading speed by about 90%, Marjorie Van de Water reports.

➤ IN THIS JET AGE most of us read at a horse-and-buggy rate. We are operating at about 20% of our reading capacity. Most adults, trying to keep abreast of an ever-increasing tide of reading matter, are nevertheless slow, inefficient readers.

Yet you can learn to read faster. You can take a 30-hour course and step up your reading rate by about 90%—if you are reasonably intelligent, have good eyes or wear correct glasses, and if you have an adequate vocabulary or are willing to put some time into increasing your vocabulary.

Some teachers claim that you can learn to read from three to ten times faster than you do at the beginning of your course. Fabulous rates of reading as high as 15,000 words per minute claimed by some teachers are considered by other, more conservative teachers as "unbelievable." But there is no doubt that the average person can boost his reading speed to a rate that he might not believe possible before training.

How To Speed Up

Here are some of the things you should do to speed up your reading rate. If, when you learned to read, you pronounced the words aloud, this practice may have left you with some bad reading habits.

Some persons still move their lips when they read, silently forming the words even though they do not speak them aloud. Others may have abandoned this habit of lip movement and mumbling but still retain movements of the tongue and vocal chords.

If you suspect that you may do this, you can check yourself by laying your fingers lightly on the side of your throat as you read. Do you feel a slight tremor or quiver of your muscles? You will naturally rid yourself of these habits left over from childhood as you force yourself to read more rapidly.

There is no time to go through the motions of pronouncing words while you are reading at top speed.

You will need to train your eyes. If your job has required you to proofread or watch carefully for misspellings, transposed letters, etc., you must make a special effort to "unlearn" this habit.

Try not to see separate words—never single letters. Look for groups of words that express a thought, especially those that are frequently used together in the same pattern and learn to perceive this entire pattern at a single glance.

Pay attention to the movements of your eyes as you read—if you have access to an optical instrument called an ophthalmograph, ask someone to use it to photograph the movements of your eyes as they follow along a line and down the page.

Many people allow their eyes to backtrack—to look back for another try at a difficult or unfamiliar word. Such backtracking is wasteful of time, tiring to the eyes and slows greatly your speed of reading. You can correct this habit, if you observe it in yourself, by forcing your eyes to move in a smooth, rhythmic way, sweeping at an ever increasing pace down the page.

There are several ways to pace yourself and force yourself to move along faster. A machine used by some reading improvement courses moves a narrow beam of light at a controlled speed down the page. This method discourages you from looking back over material you have already read because that part of the page is in darkness. Similarly, you are not tempted to "peek ahead" to find out what is coming.

If you do not have such a machine, you can use your own finger. Move it down the page at an even rate and make your eyes follow along. To time your finger movement, use a metronome or have a friend count 1, 2, 3, 4 at a steady rate.

You can train your eye to take in more at a single look. Some reading improvement courses for high government officials use a tachistoscope, or "flash meter," to expose a number or four or five words for only one-hundredth of a second.

To get an idea just how quick a one-hundredth of a second flash really is, look at a camera when there is no film in it. Set the exposure for one-hundredth of a second and watch the shutter as you press the trigger. It is really not much of a look.

You can mount some words and numbers on cards and have a friend expose the cards at one-hundredth of a second rate. At first you will probably be able to see only two or three short words but soon you can build up to four or five. At first you may have trouble reading a five-digit number but gradually you can build up to seven.

Widen Eye Span

This is similar to the way pilots and observers were taught during World War II to recognize enemy airplanes as they flashed overhead in a battle area.

It is important for rapid reading to widen your eye-span. Keep working on it until you can take in a complete line of a newspaper column at one look.

In addition to training your eyes, you can learn other things about reading that will help you get through the books and papers you want to read.

First rule, perhaps, is to be flexible. Keep in mind the purpose for which you are reading and adapt your method of reading accordingly. Some material you read for the esthetic delight in the writer's style, the artistic selection of words or the way long sentences are followed by short sentences, a staccato effect interspersed with long

READING MACHINE—With this pacer, in which a narrow beam of light moves down the page at a controlled speed, many persons have learned to increase their reading speed considerably.

smoothly flowing passages. If this is your purpose in reading a particular book or story, by all means pay attention to style and individual words.

If, however, you are reading directions for building a bookcase or a birdhouse, never mind style, go at once to the heart of the matter.

Some people, who were taught as children to plow patiently and methodically through any book "from cover to cover" have a guilty feeling if they skip or skim through any portion that is of no particular interest or value to them. But to get a lot of reading done in the limited time available, it is extremely valuable to learn how to skim. Then read carefully only those portions that contribute to your purpose.

S-P-D Approach Used

In the U. S. Department of Agriculture Graduate School reading improvement course, they teach what is called the S-P-D approach to help with reading the kind of informational material that you need to read to keep up with your job and to keep informed about what is going on in the world. The letters stand for Survey, Preread and Decide and refer to three steps that enable you to read "practical prose" more efficiently.

Step 1. S—Survey. When you pick out a book or an article to read, first size it up. Ask yourself why you are reading it—what you hope to gain from it. How is it organized? If there is a summary, read this first.

Step 2. P—Preread. This is to give you a kind of bird's-eye view of the material. First read the introduction, the first paragraph or two rapidly. Next, read the first sentence only of each paragraph until you reach the last paragraph or two—the conclusion. Well written paragraphs usually have a "main idea" sentence called the topic sentence. This is usually the first sentence in the paragraph. So if you read the first sentence of each paragraph, you will get the gist of the article quickly. Lastly, read the last paragraph or two rapidly.

Step 3. D—Decide. The process of prereading has given you a good rough idea of the contents of the material. You are now able to make up your mind whether you need to go any further with it or whether it is not going to be worth while to spend any more of your precious time on it.

If you decide that it is not going to give you the information you want, skip it and begin again on your second selection.

If, on the other hand, you find that it contains important material, you can choose one of three courses.

1. Skim it. Look carefully at any tables, graphs and photographs. Read any paragraphs that during your prereading roused your curiosity or interest. 2. Read it. If it seems worth your while, read carefully the whole article or book. 3. Study it. If it contains material you will want to remember or refer to later, go over the whole thing critically. Underline key passages or mark in the margin so that you can spot them quickly later when you wish to refer to them.

Study of students at the Agriculture Department and military officials showed that at the start of the reading course, the slowest reader could read at 115 words per minute. The fastest read at 615 words per minute.

At the completion of the short reading course, many had doubled their initial reading rate. Some even tripled their speed without appreciable loss in comprehension.

In fact, teachers find that at a faster reading rate, comprehension tends to be better because the student is paying attention to ideas rather than to words. They have learned to get quickly an impression of the main point that the author is trying to present instead of being diverted by paying attention to minor details along the way.

The effort necessary to speed up your reading is well rewarded and more and more reading matter is constantly beckoning to you to hurry on and taste it.

The presses of United States book publishers are whirring at a tremendous pace, grinding out new books to add to the total of reading matter. In 1960 more than 15,000 books were published in the U. S., not counting Government reports, directions for filling out income tax returns or pamphlets of fewer than 49 pages. One hundred fifteen works of fiction alone were published in the month of December.

Many individuals like to keep up with the best or most popular novels. In addition they may read from one to three newspapers every day. News magazines are perused regularly. Journals or trade magazines having to do with the employment of the individual must be covered. And there may also be a stack of directives, new laws or regulations, employment rules, to say nothing of daily correspondence—personal and business.

Rapid-reading courses have gained a tremendous popularity. Most universities are conducting courses in efficient reading. People, newly aware of the handicap of slow reading, are willingly paying out $150 each for 30 hours of class lessons in commercial courses. Big businesses are sponsoring courses for key employees. Government offices are putting senior officials through rapid-reading courses.

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Questions

NATURAL RESOURCES—Which process for converting salt water to fresh is the most promising? p. 237.

SPACE—What is the chemical used as fuel in a new ion engine? p. 235.

VITAL STATISTICS—What is the average life span according to latest statistics? p. 239.

Photographs: Cover, Hughes Aircraft Company; p. 235, Republic Aviation Corporation; p. 237, Westinghouse Electric Corporation; pp. 238 and 239, Smithsonian Institution; p. 242, U. S. Air Force; p. 248, Machlanburg-Duncan Co.

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ABOVE ALL A PHYSICIAN: René Théophile Laennec, 1781-1826—Jeanne Carbonnier—*Scribner*, 178 p., $2.95. Biography of the inventor of the stethoscope, his contributions to French medicine.

ADVANCES IN AGRONOMY, Vol. 13—A. G. Norman, Ed.—*Academic Press*, 386 p., illus., $12. Reviews research progress in soil and crop science and developments in agronomic practice.

THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC: For the Year 1963—Nautical Almanac Office—*United States Naval Observatory (GPO)*, 518 p., $4. Essential handbook for astronomers and navigators.

AMERICAN GOVERNMENT: Theory, Politics, and Constitutional Foundation—Peter H. Odegard and others—*Holt*, 468 p., illus., paper, $4. Text, prepared especially for students in a television class.

AMERICAN GOVERNMENT: Documents and Readings—Peter H. Odegard and Victory Rosenblum, Eds.—*Holt*, 247 p., paper, $2.50. Contains public papers, analyses, and statements gathered together for a television class.

THE ANCIENT SUN KINGDOMS OF THE AMERICAS—Victor Wolfgang von Hagen — *World Pub.*, reprint 617 p., illus. by Alberto Beltran, $12.50. Tells about the culture and civilization of the Aztec, Maya and Inca Indians.

ANIMALS AS SOCIAL BEINGS—Adolf Portmann, transl. from German by Oliver Coburn—*Viking*, 249 p., illus., $6. Gives examples of social organization among many animals from ants to apes.

AROUND THE WORLD WITH DARWIN—Millicent E. Selsam: *Harper*, 47 p., illus. by Anthony Ravielli, $2.95. Introduces Darwin's historic journey to the young reader.

AN ATLAS OF THE MOON'S FAR SIDE: The Lunik III Reconnaissance—N. P. Barabashov and others, transl. from Russian by Richard B. Rodman (Harvard)—*Interscience*, 143 p., illus., $7. First photographs of the moon's far side, results of the analysis and catalogue of formations observed.

THE AUDUBON BOOK OF TRUE NATURE STORIES—John K. Terres, Ed.—*Crowell*, reprint, 294 p., illus. by Walter W. Ferguson, $5.95. Collection of selected writings from the Audubon magazine about wild animals.

BASIC PHYSICS OF THE SOLAR SYSTEM—V. M. Blanco and S. W. McCuskey—*Addison-Wesley*, 307 p., illus., $7.50. Concise presentation of some of the basic physical aspects of the solar system.

BASIC SCIENCE HANDBOOK K-3—Wilbur L. Beauchamp and Helen J. Challand—*Scott*, 352 p., illus., $3.20. For the inexperienced as well as the experienced teacher. Gives new ideas and approaches for teaching science in kindergarten through grade 3.

BETWEEN OXUS AND JUMNA—Arnold J. Toynbee—*Oxford*, 211 p., illus., $5. The well known historian tells about a journey in India, Pakistan and Afghanistan.

BIOLOGY: Its Principles and Implications—Garrett Hardin—*Freeman*, 682 p., illus. by Evan L. Gillespie, $8. A college text.

BUILDING BLOCKS OF THE UNIVERSE—Isaac Asimov—*Abelard-Schuman*, rev. ed., 280 p., illus., $3.50. About the 102 chemical elements so far discovered. For young people.

COMBAT MISSILEMAN—James Baar and William E. Howard—*Harcourt*, 244 p., illus., $4.75. By two newspapermen attached to the trade magazine "Missiles and Rockets."

EAT NOT THIS FLESH: Food Avoidances in the Old World—Frederick J. Simoons—*Univ. of Wis. Press*, 241 p., maps, illus., $6. Describing unusual food prejudices in Ethiopia.

87 WAYS TO HELP YOUR CHILD IN SCHOOL—William H. Armstrong—*Barron's Educ. Series*, 214 p., $4; paper $1.95. Parents' guide to simple practices in the home that will aid their children and the teacher in school.

THE ELEPHANTS—Georges Blond, transl. from French by Frances Frenaye—*Macmillan*, 181 p., illus., $3.95. Story of the history, nature and skills of Asian as well as African elephants.

ESSAY ON ATOMISM: From Democritus to 1960—Lancelot Law Whyte—*Wesleyan Univ. Press*, 108 p., $2.95. A philosopher describes the evolution of atomic ideas for high school students of physics and chemistry.

THE FIRST BOOK OF AIR: A Basic Guide to the Earth's Atmosphere—David C. Knight—*Watts, F.*, 67 p., illus., $1.95. Contains air experiments for the young reader to do.

THE FIRST BOOK OF ARCHITECTURE—Lamont Moore—*Wats, F.*, 82 p., illus., $1.95. Discusses examples of architecture for worship, living, earning and governing, pleasure and learning.

THE FIRST BOOK OF PHYSICAL FITNESS—John Walsh, Statement by President John F. Kennedy—*Watts, F.*, 63 p., illus. by Julio Granda, $1.95. Gives young people a program for achieving and maintaining fitness.

THE FIRST BOOK OF TEACHING MACHINES—Sam and Beryl Epstein—*Watts, F.*, 50 p., illus., $1.95. About devices to help students increase the speed and thoroughness of learning.

FREEDOM IN THE ANCIENT WORLD—Herbert J. Muller—*Harper*, 360 p., map, illus., $7.50. Presents the history of early man and of the succeeding civilizations and empires.

FUNDAMENTALS OF SCIENTIFIC MATHEMATICS—George E. Owen—*Johns Hopkins Press*, 274 p., illus., $5. Text for a one-year preparatory course in mathematics for high school seniors.

THE GARDENER'S REMINDER—Dorothy H. Jenkins—*Crown*, unpaged, illus. by Gottscho-Schleisner, $1.50. A pictorial engagement calendar for 1962 with week-to-week suggestions.

GENERAL BIOLOGY: Laboratory Guide—Magnus Olson and others—*Burgess*, 2nd ed., 323 p., illus., paper, $4.25. Prepared for use in the general biology course at the University of Minnesota.

GEOMETRY THROUGH PRACTICAL APPLICATIONS—Julio A. Mira—*Barnes & Noble*, 280 p., illus., $1.75. Shows how to use geometry in everyday situations.

GREAT HORSE STORIES—Pamela MacGregor-Morris—*Hill and Wang*, 223 p., illus. by Susan Pares, $3.50. Collection of horse and pony stories selected from classical and modern fiction for the young reader.

A GUIDE TO FORTRAN PROGRAMMING—Daniel D. McCracken—*Wiley*, 88 p., paper, $2.95. To aid in the use of a computer for problems in science and engineering.

HEREDITY—David M. Bonner—*Prentice-Hall*, 112 p., illus., $2.95; paper, $1.50. About the gene and what it does.

HORMONES IN BLOOD—C. H. Gray and A. L. Bacharach, Eds.—*Academic Press*, 655 p., $20. Gives survey of the different hormones, and methods of their determination in blood and in other body fluids.

HUMAN GENETICS: Principles and Methods—Ching Chun Li—*McGraw*, 218 p., $8.50. From the University of Pittsburgh.

THE INCANDESCENT LIGHT: A review of its Invention and Application—Floyd A. Lewis; edited by Henry H. Urrows; foreword by

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ISLAND OF THE LOST—Paul Fenimore Cooper—*Putnam*, 256 p., map, $4. Story of an arctic island from its rise from the sea after the last Ice Age down to the present.

JOSEPH PRIESTLY: Pioneer Chemist—Rebecca B. Marcus—Watts, F., 145 p., illus. by Peter Costanza, $1.95. A biography for the young reader.

LABORATORY MANUAL OF VERTEBRATE EMBRYOLOGY—Roberts Rugh—*Burgess*, 5th rev. ed., 281 p., illus., paper, $4. Containing an entirely new section on the early development of the mouse.

THE LAND SNAIL GENUS AMPHIDROMUS: A Synoptic Catalogue, Fieldiana; Zoology, Vol. IV, No. 4—Frank Fortescue Laidlaw and Alan Solem—*Chicago Natural Hist. Mus.*, 68 p., illus., paper, $4.50. Based mainly on specimens at the Chicago Natural History Museum.

LICHEN HANDBOOK: A Guide to the Lichens of Eastern North America—Mason E. Hale, Jr.—*Smithsonian Inst.*, 178 p., illus., $4. Authoritative semipopular introduction to lichens.

LIFE'S KEY—DNA: A Biological Adventure Into the Unknown—Carleen Maley Hutchins—*Coward-McCann*, 64 p., illus., $2.50. Introduces facts about DNA and the role it plays in heredity.

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MANAGEMENT GAMES: A New Technique for Executive Development—Joel M. Kibbee, Clifford J. Craft and Burt Nanus—*Reinhold*, 347 p., illus., $10. A method for developing leadership in business.

MOLECULAR SIEVES—Charles K. Hersh—*Reinhold*, 129 p., illus., $6.50. Reviews information on use of zeolites in chemical industry.

NIGERIAN FOLK TALES—Barbara K. and Warren S. Walker—*Rutgers Univ. Press*, 113 p., illus. by Margaret Barbour, $4. Legends revealing the beliefs, morals and social attitudes of Nigeria.

ORIGINS OF THE TVA: The Muscle Shoals Controversy, 1920-1932—Preston J. Hubbard—*Vanderbilt Univ. Press*, 340 p., $6. "Objective account" of the struggles which resulted in the creation of the TVA.

THE PFIZER HANDBOOK OF MICROBIAL METABOLITES—Max W. Miller—*McGraw*, 772 p., illus., $15. A reference work for scientists.

PLANETS AND SATELLITES—Gerard P. Kuiper and Barbara M. Middlehurst, Eds.—*Univ. of Chicago Press*, 601 p., illus., $12.50. A reference work for astronomers.

PROBABILITY AND EXPERIMENTAL ERRORS IN SCIENCE: An Elementary Survey—Lyman G. Parratt—*Wiley*, 255 p., illus., $7.25. Shows the relationship of statistics and probability theory to problems in modern physical science.

PROTECTIVE CONSTRUCTION IN A NUCLEAR AGE, Vols. I & II—J. J. O'Sullivan, Ed.—*Macmillan*, 460 p., illus., $25. Papers from the proceedings of the Second Protective Construction Symposium held in March 24-26, 1959, in Santa Monica, Calif.

RADIOASTRONOMY AND RADAR—J. G. Crowther—*Criterion Bks.*, 144 p., illus. by David D. A. Hardy, photographs, $3.50. To give the general reader an account of a new science which has arisen within the last 20 years.

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SCIENCE AND THE FORESTER—Leslie Wolff: Edited by Iris Vinton; Line drawings by Kerry Lee—*Criterion Bks.*, 194 p., illus., $3.95. About a forester and his interest in trees.

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SOME RECENT DEVELOPMENTS IN THE CHEMISTRY OF PHOSPHATE ESTERS OF BIOLOGICAL INTEREST—H. Gobind Khorana—*Wiley*, 141 p., diagrams, $5.25. Based on a series of lectures at the Rockefeller Institute in the spring of 1959.

SPLENDOR IN THE SKY—Gerald S. Hawkins—*Harper*, illus., $5.95. Abundantly illustrated review of astronomy, from ancient star gazing to radio astronomy, written by astronomer for the layman.

SPORES II—H. Orin Halvorson, Ed.—*Burgess*, 296 p., illus., $4.50. A symposium held at Allerton Park, Ill., October 22-23, 1960 under the auspices of the University of Illinois and with the support of the office of Naval Research.

THE STRUCTURE AND FUNCTIONS OF AMERICAN GOVERNMENT: First Semester Study Guide—Peter H. Odegard—*Holt*, 60 p., paper, $1. Presents topics for essays and discussions.

TEEN-AGE TREASURY OF OUR SCIENCE WORLD—Seon Manley and Gogo Lewis, Eds.,—*Funk*, 335 p., illus., $4.95. Contains short stories, poetry, essays, selections from biographies and novels for the young reader.

TRAITOR WITHIN: Our Suicide Problem—Edward Robb Ellis and George N. Allen—*Doubleday*, 237 p., graphs, $3.95. A journalistic discussion of suicide during the past 15 years in America.

TREATISE ON INVERTEBRATE PALEONTOLOGY, Part Q, Arthropoda 3, Crustacea, Ostracoda—Raymond C. Moore, Ed., Asst. by Charles W. Pitrat—*Geol. Soc. of Am.*, 442 p., illus., $11.50 Seeking to organize what has been learned up to the mid-point of the present century.

THE 26 LETTERS—Oscar Ogg—*Crowell*, reprint, 262 p., illus., $5.50. Tells about the beginning of writing, invention of type, printing and the alphabet, and contains new "dictionary index."

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THIS DIFFICULT INDIVIDUAL, EZRA POUND—Eustace Mullins—*Fleet Pub.*, 388 p., photographs, $5. Because of the poet's long residence at St. Elizabeth's Hospital, this book has medical as well as literary interest.

WHY: A Book of Reason—Irving and Ruth Adler—*Day*, 48 p., illus., $2. For the young reader. Presents questions and answers from, "Why does a dog's tongue hang out when the dog is hot?" to "Why does gasoline burn, but water does not?"

WILD ORPHAN—Glen Rounds—*Holiday*, unpaged, illus. by author, $2.95. A beaver's struggle to survive.

THE WONDER OF HEAT ENERGY: A Picture Story of the Vital Part Heat Plays in Our World—Hy Ruchlis—*Harper*, 186 p., illus. by Alice Hirsh, photographs, $3.95. Describes aspects of heat energy, in nature and in industry, in non-technical language.

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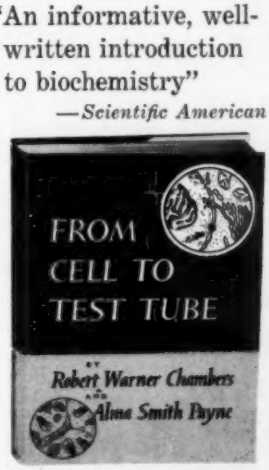

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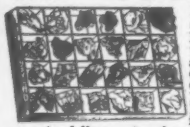

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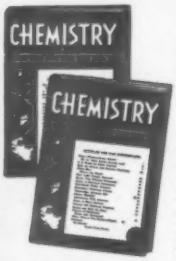

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PUBLIC HEALTH

U. S. Immunization Is Lax

Every possible step should be taken to prevent the spreading of communicable diseases. Millions on research are spent in vain if people are not immunized through vaccination.

By Jacobo Brailovky, M. D.

Dr. Jacobo Brailovsky, medical editor of La Nacion, Buenos Aires, Argentina, is guest writer for Science Service on a fellowship of the Organization of American States, Pan American Union.

➤ IN 1914, during World War I, more native soldiers in the French Army died because of a real tuberculosis epidemic than because of direct military causes on the battlefront. The contact between these men, who had no immunization against the scourge, and the troops coming from large cities, produced such a high mortality rate that it seriously worried the commanders of the Allied Forces.

The Army Medical Corps had to take every precaution and their doctors had to proceed with the immunization of all of the soldiers coming from Senegal.

As well as in the case of tuberculosis there have been far-reaching health campaigns against epidemic diseases such as cholera, smallpox, typhoid fever, polio, to mention the ones that are better known.

What has been and still is the primary purpose of all of these medical efforts? The primary purpose has been to achieve the best health for the individual human being and for the people. Its attainment has been one of the fundamental objectives of science, and to that end all of the countries of the world spend fabulous amounts of money for scientific research. Microbes and viruses are, then, the greatest enemies of mankind. To destroy them, to eliminate them from the body, or to increase physical resistance to their tenacious and aggressive action, in broad terms, represent the various phases of this uneven struggle.

Root of the Problem

My visit to the United States has permitted me once more to observe at first hand some of the essential characteristics of the problem. There is no doubt that in this country, more than in any other I have visited, there is a veritable bee-hive of technicians, biologists and researchers waging a ruthless warfare against viruses and bacteria. Millions of dollars are spent each year for scientific programs to clarify the origins of communicable diseases, to determine the carrier through which they are disseminated and, in reality, to find out thoroughly how to immunize the human being against the deadly aggression of these invisible beasts.

I would not be true to myself, as a doctor of many years' standing and a newspaperman of even more, if I did not express my thoughts concerning the ultimate application of health programs, especially in this great country, where there is a deep-rooted love for the maximum expression of individual freedom and an absolute respect for all of its institutions. But I would also like to point out that the concept of individual freedom necessarily comes to an end when this freedom implies serious danger for a man's fellow citizens.

A person who is an unconscious carrier of a communicable disease is as dangerous to his neighbors as the man who has become unbalanced and goes out in the streets, shooting at peaceful passers-by.

Can this incongruous and medieval situation be accepted in the name of individual freedom?

Compulsory Vaccination

All of the aforesaid points to the need of laws being passed, either by the individual states or by the Congress itself, to make large-scale vaccination compulsory, especially for diseases that are clearly recognizable.

It is true that persuasion and health education have done a great deal in this direction, but it is necessary to state sincerely and dispassionately that the danger of diseases persists as long as a single inhabitant of the country is a possible carrier of a communicable disease. All those millions will have been spent in vain. Scientists will continue to receive their rewards, and their prestige will continue to increase in this ambitious warfare against diseases, but mankind will still not be protected against the aggressive impact of numerous diseases, because of lack of apprehension about them, ignorance, negligence, or spirit of opposition of those who shrug their shoulders, as if it were a problem affecting only the man in question, and not the entire community.

I realize that compulsory laws will seem to many a denial of freedom. But it is not freedom that is at stake, but the safety of the entire population. This is the way the authorities have looked at it in many cases when they have passed laws for the benefit of the people. Do not the red and green traffic lights represent a curtailment of the freedom of the individual?

I have discussed this matter with eminent scientists and all are in agreement as to the necessity of taking every possible health measure and of preventing communicable diseases. But who is going to bell the cat?

Educate the people, persuade them through insistent arguments, to carry out a medical survey on epidemiological incidence, that is, to create a true health awareness. Point out every person as a possible carrier of a disease, be it unimportant or serious, to his countrymen or his loved ones, and then pass the law.

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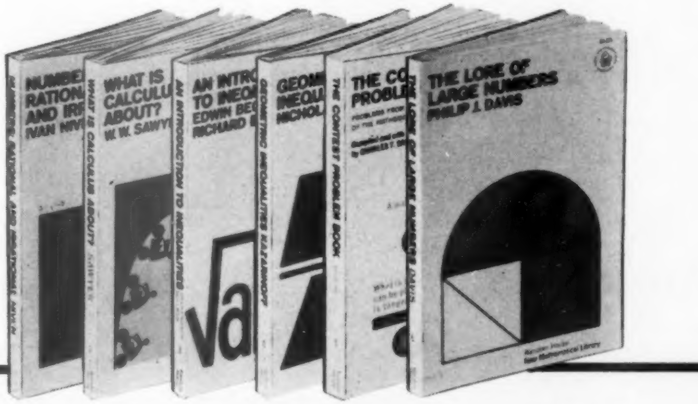

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New Ideas and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 1112. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

FOOD SURVIVAL KIT sustains one person for 14 days in an emergency situation. The 24-pound kit contains a basic multi-purpose food, 14 pints of water with vitamin C supplement and necessary utensils. With a shelf life of three to five years, it is also useful as an emergency kit for boat or airplane owners.

• Science News Letter, 80:248 October 7, 1961

TINY KEY LIGHT eliminates fumbling for the lock in the dark. Mounted in a key and giving a bright, short-range beam, the lamp is powered by a tiny silver oxide battery. A recessed button switch prevents accidental lighting in pocket or purse. Key is available in silver or gold-plated finish.

• Science News Letter, 80:248 October 7, 1961

ONE-HAND TAPE APPLICATOR for applying ½-inch and 1-inch wide pressure sensitive tapes without wrinkling, curling or waste is useful for home or office. Its single-handed action permits the tape to be rolled out and cut as needed merely by tilting and twisting. The applicator can be used over and over again.

• Science News Letter, 80:248 October 7, 1961

PEG RAIL AND HANGERS unit of aluminum for kitchen or workshop consists of a four-foot-long extruded track 1½ inches wide with 8 movable pegs 3 inches

long. The pegs slide along the horizontal track for adjustment to any position. The set, shown in the photograph, comes ready to install.

• Science News Letter, 80:248 October 7, 1961

SUPER CAR VISOR of black simulated leather contains holder for cigarettes, coin purse, glasses case, zippered map compartment, a ball point pen and an umbrella of quick-drying acetate. To install it is slipped over the visor of any car or truck.

• Science News Letter, 80:248 October 7, 1961

DISPOSABLE MEDICAL SYRINGE has a barrel made of inert polypropylene and can be used with all types of present-day medications. The plunger of the 2½ cc syringe is of inert rubber. Sterilized and sealed at the factory, the syringe features newly designed finger tabs, color coding for needle size, and an inside stop to prevent accidental withdrawal of plunger from the barrel.

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POCKET SIZE "WALKIE-TALKIE" RADIO that weighs only 18 ounces and uses eight batteries with a life of about 70 hours has a range of one mile. Featuring a push-to-talk operation, it has a 46-inch telescoping antenna that will transceive up to seven miles. The radio has no Federal Communications Commission license or minimum age requirements.

• Science News Letter, 80:248 October 7, 1961

AIRLESS SPRAY PAINT SYSTEM makes it possible to apply paint with pinpoint accuracy with virtually no fog or overspray. The portable system, completely sealed against dust, is equipped with a powerful 3-inch air motor. It is attached to any 5-gallon container by a swivel clamping technique. Accessories are available.

• Science News Letter, 80:248 October 7, 1961

Nature Ramblings

➤ IN RESPONSE to shorter days and cooler nights, the plant world is turning on its autumnal display of color.

The reds and yellows actually have been there all summer long, merely hiding beneath the green of the leaves. But now the physiological mechanisms that held the more brilliant colors in check are relaxing their grip.

In the summer months, the green leaves manufacture their own type of sugars during the daylight hours. At night, most of the food is moved out of the leaves and stored elsewhere within the plant.

When the nights become cooler, however, the nighttime transfer slows down and the sugars are trapped in the leaves. This, plus the fact that green chloroplast production falls off sharply during the shorter days, produces the reds and yellows of the leaves.

Whether the color comes out red or yellow or some shade in between depends upon the genetic make-up of the tree or plant, the light intensity during the autumnal day and

Autumn Leaves

the type of sugar trapped within the leaves. The sugar type may vary so that a particular tree may tend to have yellowish leaves, but some years they will be more reddish. Leaves also turn redder when the days are very bright.

Contrary to widely circulated myth, frost does not enhance autumnal leaf color. It kills the leaf tissue, and the leaf itself turns a dead brown and falls from the tre.

• Science News Letter, 80:248 October 7, 1961

Do You Know?

There are about 450 species of *fishes* around the Hawaiian Islands living in depths to 100 feet.

Ancient people ascribed powers of divine healing to *color* and red was thought to be the most efficacious.

Under the U. S. Atoms-for-Peace Program, eleven countries have received reactor *grants* from the United States.

More than one-third of the *deaths* in the U. S. are among people under age 65.

In a dairy experiment, cows fed four times a day produced 14% more *milk* than those fed twice a day.

Only one-third of the United States urban population receives community protection against dental caries through *fluoridation* of public water supplies.

• Science News Letter, 80:248 October 7, 1961